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XXXVIII.—*General Features of Chusan, with remarks on the Flora and Fauna of that Island.* By THEODORE CANTOR, M.D., Bengal Medical Service, &c.

[Continued from p. 278.]

WHILE engaged in examining and collecting objects of natural history in China, microscopic zoology did not altogether escape my attention. Sketches and notes were taken as often as my scanty time would permit, with a view to obtain some information about the geographical distribution of these minute animal forms, the very existence of which would have been a secret but for the revelation of the microscope. Previous use of instruments enabled me to delineate faithfully what I saw, and I have had the satisfaction to test the correctness of my sketches by comparing them after my return to Calcutta with the beautiful plates of M. Ehrenberg. To attend to anatomical structure, or the measurement of the animals themselves, lay not in my plan; partly because this branch of zoology is not sufficiently familiar to me, but chiefly because the bustle of a camp-life is anything but calculated to afford the otium indispensable to such studies. From comparison with M. Ehrenberg's great work upon Infusoria, it would appear that most of the forms observed at the island of Lantao, situated in the mouth of Canton river, and at Chusan, also inhabit Europe*. A detailed list of the localities given by Ehrenberg has been prefixed to those places where the Chinese animalcules were found.

The method I invariably followed in the examination was this: I first took a sketch of the animalcules through single lenses, of which my highest power was $\frac{1}{30}$ th of an inch, and then examined the object through a compound of 210 linear, when I nearly always found the sketch to correspond. Unless the powers of the single lenses are added in the sketches, they

* See Dr. Ehrenberg's reflections on the extensive diffusion of species among the Infusoria and their insensibility to climatic variations.—Taylor's Scientific Memoirs. Part X.—Ed.

have been taken through the medium of $\frac{1}{30}$ single lens and 210 linear compound.

The few forms I have added as "dubia" are those to which I have found none corresponding among Ehrenberg's. To G. W. Grant, Esq., an indefatigable microscopical observer, who has kindly examined my sketches and notes of Chinese animalcules, I am indebted for the following list of forms described by M. Ehrenberg, which he has recognised as also occurring in fresh water in and near Calcutta:—

Sphærosira volvox.	Navicula fulva.
Closterium turgidum.	———— turgida.
Euglena longicauda.	Vorticella patellina.
Epipyxis utriculus?	Coleps hirtus.
Arcelina aculeata.	Lepadella emarginata.
Arthrodesmus quadricaudatus.	Brachionus urceolaris.
Micrasterias hexagona.	

From what has been stated, it will appear that Indian forms (to which may be added a few Javanese) prevail in the fauna of Chusan, and that European forms make but a secondary feature. The climate of Chusan, as before observed, being that of the nearest continent, it may be inferred that Indian forms occur in central China (in those parts of course which, *cæteris paribus*, correspond with Chusan), the longitude of which is less easterly, at least up to the 30th degree north, or the latitude of that island. As the annual mean temperature of Chusan is considerably below that of tropical countries, it follows, that certain forms, and these among the lower classes of animals, which hitherto have been considered peculiar only to a tropical climate, are able to exist under a much lower temperature, and thus possess a much less limited geographical range. In what exact latitude and longitude European forms commence, is, in the present state of our knowledge of the physical condition of China, impossible to determine.

The following ably drawn up paper, which appeared in the 'Chinese Repository,' vol. iii., will serve to give a precise idea of the attention paid by Europeans to the natural history of China, from the days of the Jesuits up to the time of its publication (1834). It contains matter of general interest to naturalists, and may prove useful to those, who we may hope will ere long be enabled to engage in active investigations in that empire. "The Jesuits were the first Europeans, except Marco Polo, who made any investigation in this field. For nearly two centuries these men resided in China, and in the course of their attempts to establish themselves here, they travelled extensively throughout all the provinces. During

the reign of Kanghé, a period of sixty-one years, they were permitted to investigate everything they deemed worthy of notice, and the voluminous works they left bear testimony to their diligence. Missions were established in all the principal cities, and they were ably conducted by men who were well versed in literature and in the arts and sciences, and who would not have suffered by comparison with the best scholars of Europe: and what might we expect to find in their works concerning the natural history of China? Judging by their success in other departments, as topography, history, &c., we might reasonably hope for full and faithful narrations of the vegetable and animal productions, and also of the agriculture. Concerning some of the more remarkable productions, as bamboo, tea, &c., we have details of such length as to tire the reader. They were not the men who would let anything pass by them which could adorn their pages, or excite the wonder of readers in other countries. But what do we find on perusing their accounts? So far as those descriptions are mere translations of native authors, the defects are not to be charged to the Jesuits. They wished to tell all they could concerning China, and in their desire so to do, recorded many things which further research would have convinced them were not facts. These exaggerated statements have conspired to create ideal notions of the character, policy and country of the Chinese, which future travellers, we apprehend, will find erroneous. Among all their remarks on natural history we do not find a single continued narration of facts which the author asserts as having come under his own eyes. There was no Linnæus or Cuvier who would be satisfied with faithfully recording the results of his own observation. If such had been the case, the united labours of these 'fathers' would have presented rich materials for compiling a work on the natural history of China, but which must now be reserved for others. In considering the merits and demerits of these writers, however, we must remember that they lived in an age when the public taste was satisfied with nothing but tales almost beyond the bounds of belief. Their accounts are not more improbable than what we find in Buffon; and these men flourished long before his time. Besides, it was for their interest to portray this country in as favourable an aspect as possible: their situation was such as required all the aid that interesting description could bring. The want of any well-digested work on natural history also presented itself as a serious obstacle against pursuing the science in a useful way. If observations were made, how could they be compared with previous ones and their relative importance ascertained? This was a hindrance

of which we can hardly have a full conception in the present advanced state of the science. With the want of books the precarious tenure of the establishment of the Jesuits here may also be adduced as a reason why so few turned their attention to such subjects. Liable every moment to be driven out of the country, the leaders would naturally bend all their energies to secure that which had already been gained, and leave others to narrate what was seen. The erroneous ideas concerning the natural history of this country which have become current among the great mass of readers in the West is a serious evil, and one which has been occasioned chiefly by the exaggerated statements of these early writers. Every author for the last century who wished to write concerning China needed only to open the volumes of the Jesuits, and long descriptions on every subject met his eye. These he wrought into his own phraseology, and spared not to enlarge or reduce them to suit his own convenience. The consequence is, that the same thoughts, being presented in many lights and by authors of reputation, are received as accredited truths. An instance of this is found in Malte-Brun's 'Geography,' who states, on the authority of a member of the Dutch embassy, 'that the Chinese farmer yokes his wife and ass together at the plough;' and this is said in such a manner as to convey the idea that it is a common occurrence; while the instances of such brutality are as rare in China as in Persia or India, or any other country in the same state of civilization. Concerning the accounts of the Jesuits in general, we may observe, that when they are satisfactorily proved or disproved, and the truth sifted from the rubbish which surrounds them, they will be found to contain much valuable information; but until they have been carefully compared with renewed investigations, they must be cautiously received. We will now proceed from the works of the Jesuits, which for the most part were written before the eighteenth century, to consider what has been done by more recent observers. In 1750 Peter Osbeck came to China as chaplain to a Swedish East Indiaman, and made some discoveries in the vicinity of Canton. He was a disciple of Linnæus, and had imbibed his master's love for the works of nature. The freedom allowed to foreigners at that time enabled him to extend his researches in this hitherto unexplored field to a considerable distance round the city. He collected many plants in the vicinity of Canton and the anchorage at Whampoa. The remembrance of his zeal and success was perpetuated by Linnæus in the *Osbeckia chinensis*; and a friend and assistant was remembered in the *Torenia asiatica*. These, we believe, are the only instances of any persons who

came to China for only a single season, that improved the opportunity to extend the knowledge of its natural history. Other ports, as Shanghai and Amoy, were once open to foreigners, but the desire for gain was then so strong as to engross all the time of those who visited them. From the time of Osbeck till the embassy under Macartney in 1793, we read of none who explored these wide fields. No Tournefort or Pursh was found who would willingly endure the fatigues and dangers of visiting China from a love of natural history. The embassy under Lord Macartney was provided with competent naturalists, and the advantages enjoyed were many; yet the results do not appear to have been considerable. In a journey from Teentsin to Jeho (Zheho) and then through Peking to Canton, abundance of opportunities must have been presented to enlarge our knowledge of this country. But the same causes which will retard future labourers hindered the researches of the members of this embassy; the jealousy of the Chinese government prevented them from examining most of the interesting objects which came in their way while travelling through the country. The works of Staunton and Barrow, however, contain many valuable notices of the natural history of China; and if the embassy did not open a more favourable trade to its projectors, it enabled us to form more correct ideas of the real aspect of the country, both in a political and natural point of view. The remarks were such as would naturally be made by those travelling in a circumscribed manner, and relate principally to agriculture and the natural scenery. The Dutch embassy to Peking in 1795 under Van Braam does not appear to have made many remarks concerning the natural history of the districts through which it passed. From the time of that embassy to the one under Lord Amherst in 1816, very little was done in this branch of knowledge in China. When that expedition was proposed, the advantages that would accrue from having an able and scientific naturalist were duly appreciated by the projectors. Such a one was found in Dr. Abel, and the result showed that the expectations of those who recommended him were not ill founded. Everything necessary to enable him to transport the specimens, whether on shore or on board the ship, was done, and no expense spared in affording him all the facilities possible during the journey. From Teentsin to the capital the way was closely examined; but from Peking to Canton few observations were made or specimens collected, on account of the rapidity of travelling. Besides, Dr. Abel was taken sick on his return and prevented from personal research to the extent he wished. The gentlemen of the embassy, however,

brought him every specimen they saw worthy of notice. At Canton, the whole collection of plants, minerals, and other objects which had been collected were put on board H.M.S. *Alceste*, the ship that brought the embassy to China. The loss of that vessel in Gaspar Straits, and with her Dr. Abel's entire collection and the notes appended to it, deprived the world of much valuable information. Except a very few specimens he gave to some friends at Canton, everything he had collected perished with the *Alceste*. Among these preserved specimens Sir Joseph Banks found some new plants, one of which, *Abelia chinensis*, commemorates the zeal of the naturalist. Since this expedition nothing of importance has been done in any department of natural history, excepting botany. To this branch a few of the gentlemen attached to the Hon. E. I. Company's factory have paid some attention. The Horticultural Society of London in 1819 sent out Mr. Kerr, a gardener, to collect and buy living plants and send them home, but his success was only partial. Many new plants have been discovered among those which have been sent home by the residents at Canton. The steady demand for these, both among foreigners and natives, has induced the Chinese to bring rare plants to this city; they are kept for sale at Fahte, the 'flower-gardens' near Canton. The number of plants shipped to Europe and America yearly is considerable, and the demand is increasing. According to Livingstone, not one in a thousand reaches their destination; yet from the immense number sent in a long course of years, we may safely infer, that one-half of all known Chinese plants have been discovered and named in this way. Great care is necessary to preserve them on board ship in a voyage of such length, and from the want of this care consequently many of them die. Different plants require such different attention, that what saves one kills another. But the number of names probably far exceeds the number of species, for the Chinese gardeners are skilful in altering the appearance of flowers, and finding it for their interest so to do, they devote much time to the pursuit. From this short sketch it appears, that in the natural history of the Chinese empire much remains to be done. The Chinese works on this subject are voluminous, and they contain dissertations on plants of all kinds and qualities, chiefly those used in medicines; on gems, of which they are fond; on quadrupeds, birds, fishes and insects; and even shells and mollusca are not overlooked by them. On the same pages we also find accounts of tiger-elephants, dragons, and other similar fantasies. The entire range of natural science in the Chinese empire will require thorough investigation, for what has been done needs to be

done again. Botany has attracted most attention, and the progress made in it from various sources is considerable; but the grasses, the cryptogamic plants and some other branches of the study, are nearly unknown. The works of the Jesuits contain notices of the larger animals of China, but with the other branches of zoology we are imperfectly acquainted. The birds and the fishes, the insects and the mollusca, will each afford sufficient materials for many interesting volumes. Mineralogy is on the same level; but the precious gems, the beautiful crystals of quartz, the white copper and the gypsum seen in Canton, show the abundance of its mineral treasures; the variety of metals cannot be small, but their full extent cannot be yet known. Of the geology of this empire very little knowledge has been gained by Europeans; and of the organic remains, which we may expect to be considerable from those found in Ava and Siberia, still less is known. It will be apparent then, that the investigation of China and its dependencies will open a field of research that is unequalled in the world. From Samarcand to Formosa and Japan, and from Saghalien to Camboja, is a field, which is nearly unknown. Peopled from the remotest antiquity with wandering nomades, who have despised agriculture and employed themselves in enslaving their neighbours, Tartary is about the same now as it was a thousand years ago. China has undergone many alterations, and the face of the country, by increase of population, has assumed the appearance of an extended garden, when compared with the countries on the western boundary. We hope this interesting and wide field will soon be carefully surveyed in all its departments. The Chinese are not so savage as the Arabs, nor so deceitful as the Moors, nor so wandering as the North American Indians, in whose countries travellers have passed many years. From the appearance of the times, we expect the Chinese empire will soon be open to foreigners, and we trust that the naturalist will not be slow to enter on a field abounding with objects worthy of his attention."

It may perhaps not be deemed irrelevant to offer a short account of the auspices under which the objects of the following descriptive catalogue were collected. In the earlier part of 1840 the Supreme Government had determined upon despatching forces to China. The opportunity thus offered of seeing service, and at the same time of visiting a field hitherto closed to science, was too tempting to be allowed to pass, and I ventured to solicit of the Rt. Hon. the Governor-General that I might become attached as Assistant-Surgeon to one of the regiments about proceeding on the Eastern expedition. In the mean time I had been ordered to march to the northern pro-

vinces with a detachment of H.M. troops, part of which had been under my charge on their passage from England, and had arrived in the vicinity of Hazareebaugh, when I was relieved with orders to proceed to the Presidency. On my subsequent return to Calcutta I received intimation that H.E. the Commander-in-chief had been pleased to post me to H.M. 49th regiment, then *en route* to join the expedition to the eastward. In an interview with the Rt. Hon. the Governor-General, I was honoured with his Lordship's commands, that I should collect objects of natural history for the Museum of the Honourable the Court of Directors, to which effect I was to be furnished with materials and instructions, that I should inquire among the medical officers of the expedition if there were a botanist capable and willing to undertake the botanical part of the future inquiries. I was further instructed to correspond upon matters connected with my charge with his Lordship's private secretary. Fully imbued as I was with a sense of the high honour which his Lordship had been pleased to confer, I became also aware of the responsibility it devolved upon me. Hitherto my labours in natural history had been of a strictly private nature, and to this as well as to the difficulties which I have had to encounter, I have always attributed the liberal encouragement with which my humble exertions have been received by some of the first philosophers. During the few days which elapsed after my interview with his Lordship, I was vigorously engaged in making arrangements connected with the execution of my scientific mission, when I was ordered to assume the medical charge of a detachment of H.M. 26th regiment, with which I, the following day, embarked for China. My sudden departure from Calcutta prevented me from obtaining his Lordship's instructions, and also a number of articles absolutely necessary for preserving objects of natural history, all of which were now to follow. Our visits to Penang and Singapore enabled me indeed to obtain a few of those necessaries, which, however, notwithstanding their exorbitant prices, proved to be utterly inefficient. Nearly during the whole month of June 1840 we were detained at the island of Lantao, in Canton River (Chookeang or Pearl River), which afforded me an opportunity of becoming somewhat acquainted with the leading features of the flora and fauna, and I commenced forming botanical and zoological collections during the hours of leisure left by my military duty. On our arrival at Chusan in July we had the good fortune of landing our original number of troops, all in fine state of health, which I chiefly attribute to the excellent arrangements of the commanding officer, Captain Paterson, of

H.M. 26th regiment. Shortly after I became exempted from military duty as long as my services could be spared, agreeably to instructions upon the subject from H.E. the Commander-in-chief of India. From the state in which I by this time found the collections I had made shortly before at Lantao, I was disagreeably apprised of the bad quality of my materials for preserving, though this was only the commencement of subsequent mortification, felt on witnessing the destruction of objects nearly as fast as I contrived to collect them. Time becoming precious as the season for collecting was rapidly advancing, and the prospects of the arrival of a supply of materials from Government being uncertain, I had only one course left, to sketch the living objects. The illustrious Mr. MacLeay has observed, that the use of the pencil and brush is as necessary to a naturalist as the power of reading and writing. I felt the truth of these words at this juncture, when I had no hopes of success in preserving collections, though I was determined upon not altogether losing the opportunity. Not having received the instructions of the Rt. Hon. the Governor-General as to the objects of my inquiries, I directed them to general features, on the same principle as the artist does who intends to produce a familiar likeness. An entire though hasty outline will better serve the purpose than if he were to produce an elaborate representation of single parts or features. I do not mean to deny that a thorough study of any single branch of zoology may prove of the greatest importance to throw light upon the physical condition of a country; but I am alluding to the peculiar position under which I was placed in a field new to science. About the end of August I was fortunate enough to receive a quantity of spirits of wine and bottles, timely enough to save part of the zoological collections from destruction. As I had not succeeded in my search for a botanist, I trained my servant to assist me in collecting plants and seeds, while my own time was divided between searching for specimens, sketching them, and taking notes. At this period the dreadful extent of sickness, ravaging during our first occupation of Chusan, rendered the assistance of every medical officer necessary, and I was ordered from my residence to perform regimental duty with H.M. 26th regiment. The Cameronians were encamped on the slope of a steep hill, at a considerable distance from the house in Ting-haé where I lived, among the collections. The large building had been appropriated to the office of the chief magistrate, and during my stay there I had the pleasure of affording medical assistance to the European establishment as well as to a number of cases among natives connected with

that office, which latter circumstance afforded some opportunity of more closely observing the habits of the people. The difficulties which the Chinese language imposes upon the foreigner, the kindness of the Rev. Mr. Gutzlaff had in some measure enabled me to obviate. I had put down and numbered all questions upon which I wished information, opposite to which Mr. Gutzlaff had furnished the Chinese version. The latter I produced in my excursions to the Chinese, who, as they nearly all can read and write, seldom failed to write a reply on a blank paper, to which I attached the number corresponding to my question, and was afterwards favoured by Mr. Gutzlaff with a translation. That information of such a kind must be used *cum grano salis*, it is scarcely necessary to add. The bodily fatigue I had daily to encounter in the execution of my duty, the beyond description distressing nature of the duty itself, I have reason to believe laid the foundation of my subsequent severe illness. I had scarcely been relieved from military duty and busily engaged in turning the short remaining season to the best possible account, when I became a victim to a violent cerebral fever, and was subsequently ordered to sea by the Medical Board at Chusan, in a state, I am informed, which held out but slight prospect of my surviving. I have now but to perform the pleasing task of expressing my gratitude to Sir Gordon Bremer, K.C.B., Col. Mountain, C.B. of H.M. 26th regiment, in addition to those officers on the expedition mentioned in the descriptions, to whose kindness, during my sojourn at Chusan, I feel myself greatly indebted. To G. A. Bushby, Esq., Chief Secretary to the Government of India, I beg to express my best thanks for his great liberality, which the important avocations of a high office never prevented from rendering every assistance to facilitate my scientific task. To J. W. Grant, Esq., B.C.S., I take this opportunity of acknowledging the repeated and through years unaltered benefits which I have derived from his extensive, but unassuming knowledge of the natural history of India. In placing the Mollusks at the disposal of W. H. Benson, Esq., B.C.S., I was guided by the conviction, that I could not turn them to greater advantage to science; and while I beg to offer my best thanks for the liberality with which that distinguished naturalist has met my request, his own descriptions carry the best proof of the correctness of my estimate.

[To be continued.]